CHARGE NUMBER: 1901

PROJECT TITLE: Biochemical Modification of Tobacco

PERIOD COVERED: July 1-31, 1980

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I. TOBACCO MATERIALS STUDY

A. Large Scale Thin/Bodied Tobacco Expansion

Assistance was provided in sampling forty-eight Burley samples and fifty-two Bright samples for thin/bodied tobacco expansion conducted at the Manufacturing Center. Sixteen of the Burley samples and eighteen Bright samples were processed and expanded. They were submitted to the Microstructure Facility for cell size determination.[1,2] The largest averaged epidermal cell sizes were observed to occur within the "thin" grades of tobacco (both Bright and Burley).[3]

B. Ratooned Tobacco

The third-year study of ratooning bright tobacco was started in the early part of the month of July. Tobacco plants were topped to 6-8 inches from the ground. A main sucker growth after the topping was saved from each plant.[4]

C. Small Scale Aging Study

The microbial profiles of the 18th-month samples from a small-scale aging study were determined.[4]

D. Tobacco Protease

Protease activities in green tobacco extract, frozen and freeze dried samples were determined. All activities were low. Work on isolation of possible protease inhibitors was begun.[4]

II. CELLULASE

A. Reducing Sugar Formation in Cellulase Treated Tobacco

Sterile cut filler was treated with water, buffer or cellulase and the reducing sugar contents were determined. Cellulase-treated tobacco showed an increase in total reducing sugars as compared with the buffer or water-treated samples (5.7% to 1.7% and 2.0%). From these results it is apparent that sugar is produced in tobacco samples due to cellulase treatment.[5]

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B. Cellulase Production Study

A fifteen-day time study for production of Avicel induced Tv cellulase was run. Activities in different enzyme fractions, pH change, sugar content change, and change in biomay were studied.[5,6]

C. Electrophoretic Determination of Cellulase Components

An acrylamide gel electrophoresis run was made. The fourth enzyme band which was missing in the recent enzyme preparations was detected in small quantity in the last enzyme preparation; but it was still small compared to the bands from last year's preparations. A small increase in expansion (7-10%) was noticed in cellulase treated samples over controls. The causes of different enzyme productions (the 4th band) will be investigated.[5]

D. Stress-Relaxation

A report on the stress-relaxation study of cellulase treated tobacco was prepared and will be issued shortly.[5]

E. Equipment Set-up

A Perkin Elmer HPLC and a Beckman DU-8 spectrophotometer were set-up and are ready for use.

III. DENITRATION

A. Scale-up

Preliminary meetings have been held with Chemap S.A.

Plant designs including plot maps, Philip Morris, U.S.A. Engineering specifications, tank sizes and utility requirements were discussed, and presented. In addition, production scheduling as it effects plant design was considered.

As additional information is acquired, it will be transmitted to Chemap for design inclusion. Future trips to Chemap (Woodbury L.I., U.S.A.) are anticipated and will include R&D, Process Engineering, Park-500 and Third Line personnel.

B. Additional Work

Within the next week, additional work will be performed to determine heats of reaction and the effect of denitrated liquor pH on sheet tensile strength. The work will be done at R&D and Park-500.

C. FTR Process

All equipment and supplies for FTR usage have been received. Equipment is being modified where necessary and will be ready for FTR usage on schedule. Necessary assistance will be provided to FTR personnel when needed.

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REFERENCES

1. Memo: D. M. Teng to Distribution, July 7, 1980, "Sampling of DBC Bright and DBC Burley Lines for Microstructure Analyses."

2. Memo: D. M. Teng to Distribution, July 15, 1980, "Samples for Microstrucutre Analyses (Thin/Bodied Bright and Burley Lines)."

3. Memo: I. Uydess to Distribution, July 21, 1980, "Expansion of Thin vs Bodied Tobacco: Epidermal Cell Size and Stalk Position Analysis."

4. G. M. Nixon, P.M. Notebook #7208.

5. E. D. Mooz, P.M. Notebook #7443.

6. S. Tenhet, P.M. Notebook #7225.

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